

EXHIBIT 12

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

**WSOU INVESTMENTS, LLC D/B/A
BRAZOS LICENSING AND
DEVELOPMENT,
*Plaintiff,***

Case No. 6:20-cv-00956-ADA

JURY TRIAL DEMANDED

V.

**ONEPLUS TECHNOLOGY
(SHENZHEN) CO., LTD.,**
Defendant.

PLAINTIFF’S AMENDED FINAL DISCLOSURES OF PRELIMINARY INFRINGEMENT CONTENTIONS

Pursuant to the Court’s Order Governing Proceeding – Patent Case (“Order Governing Proceeding”), Plaintiff WSOU Investments, LLC d/b/a Brazos Licensing and Development (“WSOU”) hereby provides its Amended Final Initial Infringements Contentions to defendant OnePlus Technology (Shenzhen) Co., Ltd. (“OnePlus” or “Defendant”) for U.S. Patent No. 7,477,876 (the “’876 Patent”).

WSOU makes this disclosure based on the information presently available to it. Discovery in this case has not started, and WSOU reserves its right to amend or supplement these disclosures as permitted by the Federal Rules of Civil Procedure, by the local rules of the Western District of Texas, and by order of the Court, including the Court's Order Governing Proceedings.

For each Asserted Claim, Plaintiff identifies the following Accused Instrumentalities of which it is currently aware. The identification of Accused Instrumentalities is based on Plaintiff's research and analysis to date, without the benefit of discovery from the Defendant. Plaintiff reserves the right to add, delete, substitute or otherwise amend this list of Accused

Instrumentalities based on discovery or other circumstances, in a manner consistent with the Federal Rules of Civil Procedures, local rules, and standing orders.

The Accused Instrumentalities include, without limitation, the following:


- OnePlus 8 Series Phones (i.e., OnePlus 8 Pro and OnePlus 8) implementing 5G capabilities.
- All past, current and future OnePlus products and services that operate in the same or substantially similar manner as the specifically identified products and services above and described in Exhibit 1.
- All past, current and future OnePlus products and services that have the same or substantially similar features as the specifically identified products and services above and described in Exhibit 1.

Plaintiff's infringement contentions apply to the Accused Instrumentalities as well as all other past, current and future hardware and software products and services developed, made, used, offered for sale, sold, imported, and provided by OnePlus that contain or makes use of the Patented Technology.¹

Based upon currently available information, WSOU asserts that OnePlus has infringed and/or continues to infringe the patent and claims identified in the attached claim charts (the "Asserted Claims" of the "Patent-in-Suit"). Infringement claim charts evidencing the correspondence between (i) the elements of the Asserted Claims, and (ii) the corresponding items of the accused products are attached hereto. Further, Exhibit 1, which is attached hereto and incorporated by reference, is an exemplary infringement claim chart identifying specifically where each limitation of each Asserted Claim is found within each Accused Instrumentality or practiced by each Accused Instrumentality.

¹ "Patented Technology" means all technologies described in the claims of the Patent-in-Suit.

Plaintiff asserts that Defendant has directly infringed and continues to directly infringe the Asserted Claims literally through the Accused Instrumentalities by making, using, offering for sale, and/or selling, or importing into the United States the Accused Instrumentalities. To the extent that Defendant alleges that one or more limitations of the Asserted Claims are not literally found in the Accused Instrumentalities, Plaintiff alleges that such limitations are found in or practiced by the Accused Instrumentalities under the doctrine of equivalents. Any differences alleged to exist between any of the Asserted Claims and any of the Accused Instrumentalities are insubstantial and that each Accused Instrumentality also meets each limitation under the doctrine of equivalents as the identified features of the Accused Instrumentality performs substantially the same function in substantially the same way to achieve substantially the same result as the corresponding claim limitation. WSOU reserves the right to assert infringement solely under the doctrine of equivalents with respect to any particular claim element(s), if warranted by discovery, further analysis, and/or claim constructions in this case.

Accused product	Evidence
OnePlus 8	<p>Operating System: OxygenOS based on Android™ 10 CPU: Qualcomm® Snapdragon™865 5G Chipset: X55 GPU: Adreno 650 RAM: 8GB/12GB LPDDR4X Storage: 128GB/256GB UFS 3.0 2-LANE Battery: 4300 mAh (non-removable) Warp Charge 30T Fast Charging (5V/6A)</p>  <p>Source: https://www.oneplus.com/8/specs?from=8</p>
OnePlus 8 Pro	

	<p>Operating System: OxygenOS based on Android™ 10 CPU: Qualcomm® Snapdragon™ 865 5G Chipset: X55 GPU: Adreno 650 RAM: 8GB/12GB LPDDR5 Storage: 128GB/256GB UFS 3.0 2-LANE Battery: 4510 mAh (non-removable) Warp Charge 30T Fast Charging (5V/6A) 30W Wireless Charging</p>  <p>Source: https://www.oneplus.com/8-pro/specs?from=8pro</p>
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Plaintiff further asserts that Defendant has indirectly infringed and continues to indirectly infringe by actively inducing infringement of one or more of the claims of the Asserted Patent through the Accused Instrumentalities. Plaintiff also asserts that these third-parties directly infringe at least one or more of the claims of the Asserted Patent through the manufacture, use, sale, offer to sell, or importation of the Accused Instrumentalities.

For example, Defendant has actively induced infringement by encouraging the use of the Accused Instrumentalities in ways that infringe each Asserted Claim, including, but not limited through providing instructions to its customers and partners to encourage and instruct the user or partner to utilize the accused product in an infringing manner. Defendant knew or should have known that such encouragement would induce infringement. Defendant has taken active steps with the specific intent to encourage and cause others to use each Accused Instrumentality in ways that infringe each Asserted Claim. Such active steps by Defendant with specific intent to induce infringement have included, among other things, advertising, promoting, marketing, making available for use, offering to sell, and/or selling the Accused Instrumentalities to others; encouraging and influencing others to import, offer to sell, and/or sell the Accused Instrumentalities; directing and instructing others to use the Accused Instrumentalities in infringing ways; and by providing the Accused Instrumentalities to others. OnePlus has performed the aforementioned active steps with the knowledge of the Asserted Patent at least as of the date

when the complaint in this case was filed. OnePlus has known or should have known that the acts it has induced constitute infringement because, for instance, it has been aware that end users and resellers will purchase the Accused Instrumentalities will use them, resulting in direct infringement.

Further, for instance, the Accused Instrumentalities are known by Defendant to be especially made or especially adapted for use to infringe the Asserted Patent, and are not staple articles or commodity of commerce suitable for substantial non-infringing uses. Defendant contributes to the infringement of the Asserted Patent by making available for use, offering for sale, selling, and/or importing the Accused Instrumentalities to third parties, who use the Accused Instrumentalities and/or practice one or more claims of the Asserted Patent. Moreover, Defendant has had notice of the Asserted Patent at least as of the filing of the Complaint in this case.

These Infringement Contentions, including Exhibit 1, are based upon publicly-available information, and Plaintiff's research and analysis to date. The Accused Instrumentalities involve confidential, proprietary designs that are not publicly available, and Defendant has not yet provided discovery. Discovery is ongoing, and Plaintiff anticipates that the subject matter of these infringement contentions will be the subject of expert discovery. Discovery will provide evidence of Defendant's infringement, may lead to the discovery of additional instances of infringement, and may also enable identification of additional claims that are infringed by Defendant. Plaintiff reserves the right to add, delete, substitute, or otherwise further amend these Infringement Contentions based on discovery or other circumstances, in a manner consistent with the Federal Rules of Civil Procedures, local rules, and standing orders. Plaintiff explicitly reserves the right to further modify and/or supplement these contentions with additional or different theories and/or additional or different evidence. Further, WSOU reserves the right to supplement or revise its

infringement contentions and/or chart, including identification of additional asserted claims, based on, for example, new versions or variations of one or more of the Accused Instrumentalities that are later discovered.

PRIORITY DATE

Each of the Asserted Claims of the '876 Patent is entitled to a priority date of no later than November 2, 2001. The subject matter described by the Asserted Claims, however, may have been conceived and reduced to practice prior to this priority date. WSOU also reserves the right to update its contentions with evidence of an earlier conception and reduction to practice through discovery including identifying any portions of the file history as containing evidence of conception and reduction to practice. Plaintiff's research and analysis is ongoing and Plaintiff reserves the right to assert that the claims are entitled to a priority date that is earlier than the above date.

Dated: October 26, 2021

RESPECTFULLY SUBMITTED,

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BRAZOS LICENSING AND
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CERTIFICATE OF SERVICE

A true and correct copy of the foregoing instrument was served or delivered electronically to all counsel of record, on this 26th day of October, 2021.

/s/ Jonathan K. Waldrop

Jonathan K. Waldrop

**Exhibit 1 to
WSOU Investments, LLC's
Amended Preliminary Infringement Contentions**




Infringement Claim Chart of U.S. Patent No. 7,477,876 (the “Asserted Patent”)

The Accused Instrumentalities include, without limitation, OnePlus Technology (Shenzhen) Co., Ltd. (“OnePlus” or “Defendant”); OnePlus 8 Series Phones (i.e., OnePlus 8 Pro and OnePlus 8) implementing 5G capabilities; all past, current and future OnePlus products and services that operate in the same or substantially similar manner as the specifically identified products and services; and all past, current and future OnePlus products and services that have the same or substantially similar features as the specifically identified products and services.

WSOU Investments, LLC (“WSOU” or “Plaintiff”) contends that OnePlus, including OnePlus’s employees, directly infringes each of the Asserted Claims, either literally or under the doctrine of equivalents. WSOU also contends that OnePlus has indirectly infringed and continues to indirectly infringe by contributing to and actively inducing infringement of one or more of the Asserted Claims.

WSOU does not intend this exemplary claim chart to be limiting, and WSOU reserves its rights to pursue other accused instrumentalities, patent claims, evidence, and infringement arguments in this case.

Exhibit(s)	Description	Link
Exhibit A	OnePlus 8 Pro Product Page	https://www.oneplus.com/8-pro/specs
Exhibit B	3GPP TS 38.214 version 15.2.0 Release 15	https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf
Exhibit C	5G Terminology	https://www.5g-networks.net/uncategorized/5g-terminology-the-gnb/
Exhibit D	3GPP TS 38.321 version 15.2.0 Release 15	https://www.etsi.org/deliver/etsi_ts/138300_138399/138321/15.02.00_60/ts_138321v150200p.pdf
Exhibit E	Semi-persistent CSI Reporting	https://www.sharetechnote.com/html/5G/5G_CSI_Report.htm
Exhibit F	Bandwidth Part (BWP)	http://www.techplayon.com/5g-nr-bandwidth-part-bwp/
Exhibit G	Product Part(Full Description)	https://www.oneplus.com/8?from=head

Claims	OnePlus 8 and 8 Pro (The accused products)			
1Pre. A method for transmitting channel quality information in a wireless communication system comprising at least one base station and at least one mobile station, the method comprising:	<p>The accused products practice a method for transmitting channel quality information in a wireless communication system comprising at least one base station and at least one mobile station.</p> <p>OnePlus 8 series mobile devices (i.e., OnePlus 8 Pro and OnePlus 8) are the latest releases of OnePlus that support 5G in their Mobiles.</p> <p>OnePlus 8 series comprises of 5G supported Qualcomm Snapdragon 865 processor along with the Qualcomm Snapdragon X55 5G Modem-RF system for transmission of signals (i.e., Channel Quality Information), as shown in Fig. 1 and Fig. 2.</p> <div><div><p>Citation 1: OnePlus 8 Pro Specifications</p><table><tr><td>Performance</td><td><p>Operating System: OxygenOS based on Android™ 10 CPU: Qualcomm® Snapdragon™ 865 5G Chipset: X55 GPU: Adreno 650 RAM: 8GB/12GB LPDDR5 Storage: 128GB/256GB UFS 3.0 2-LANE Battery: 4510 mAh (non-removable) Warp Charge 30T Fast Charging (5V/6A) 30W Wireless Charging</p></td><td></td></tr></table></div></div> <p>Fig. 1</p> <p>Source: https://www.oneplus.com/8-pro/specs, Page 1 and 2, Last Accessed on April 27, 2021, Exhibit A</p>	Performance	<p>Operating System: OxygenOS based on Android™ 10 CPU: Qualcomm® Snapdragon™ 865 5G Chipset: X55 GPU: Adreno 650 RAM: 8GB/12GB LPDDR5 Storage: 128GB/256GB UFS 3.0 2-LANE Battery: 4510 mAh (non-removable) Warp Charge 30T Fast Charging (5V/6A) 30W Wireless Charging</p>	
Performance	<p>Operating System: OxygenOS based on Android™ 10 CPU: Qualcomm® Snapdragon™ 865 5G Chipset: X55 GPU: Adreno 650 RAM: 8GB/12GB LPDDR5 Storage: 128GB/256GB UFS 3.0 2-LANE Battery: 4510 mAh (non-removable) Warp Charge 30T Fast Charging (5V/6A) 30W Wireless Charging</p>			

Citation 2: OnePlus 8 Specifications

Born to perform

Power ahead with the latest Qualcomm® Snapdragon™ 865, which delivers up to 25%* faster performance than previous generations.

X55 Dual Mode 5G

Connect to multiple networks at the same time for wider coverage and faster potential download speeds*.



UFS 3.0

Transfer photos, videos, and files in a snap with UFS 3.0 file management system. An improved file system delivers 125%* faster write speeds than previous generations.

Fig. 2

Source: <https://www.oneplus.com/8?from=head>, Page 4, Last Accessed on April 27, 2021, Exhibit G

Qualcomm Snapdragon 865 processor along with X55 RF modem functions on the 3GPP release 15 specifications of 5G technology. In specific, the 3gpp 38.214 is a 5G based standard that specifies and establishes the characteristics of the physical layer procedures of data channels for 5G-NR.

According to the 3GPP standard, TS 38.214, the User Equipment (i.e., UE), such as OnePlus 8 series (i.e., mobile station) reports (i.e., transmits) the channel state information (CSI) that comprises of channel quality indicator (i.e., channel quality information), in a 5G telecommunication network. Further, the CSI reporting is controlled by gNB (i.e., base station). See Fig. 3 & Fig. 4.

	<p style="text-align: center;">Citation 3: UE reports CSI</p> <p style="text-align: center;">5.2 UE procedure for reporting channel state information (CSI)</p> <p style="text-align: center;">5.2.1 Channel state information framework</p> <p>The time and frequency resources that can be used by the UE to report CSI are controlled by the gNB. CSI may consist of Channel Quality Indicator (CQI), precoding matrix indicator (PMI), CSI-RS resource indicator (CRI), SS/PBCH Block Resource indicator (SSBRI), layer indicator (LI), rank indicator (RI) and/or L1-RSRP.</p> <p style="text-align: center;">Fig. 3</p> <p>Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf, Page 31, Last Accessed on April 27, 2021, Exhibit B</p> <p style="text-align: center;">Citation 4: gNB is 5G terminology for base station</p> <p style="text-align: center;">5G Terminology: The gNB</p> <p>5G specifications are ongoing, so there are new acronyms to remember. So after the BTS (Base Transceiver Station) in 2G, the NodeB in 3G, the eNB in 4G, here comes the gNB in 5G.</p> <p style="text-align: center;">Fig. 4</p> <p>Source: https://www.5g-networks.net/uncategorized/5g-terminology-the-gnb/, Page 1, Last Accessed on April 27, 2021, Exhibit C</p>
<p>1a. varying a rate for reporting channel quality information</p>	<p>The accused products practice a method that comprises, varying a rate for reporting channel quality information from a mobile station to a base station as a function of the presence or absence of a reception of a data transmission at the mobile station.</p>

<p>from a mobile station to a base station as a function of the presence or absence of a reception of a data transmission at the mobile station,</p>	<p>One Plus 8 Pro supports 5G based standards such as 3gpp 38.214.</p> <p>The UE (e.g., One Plus 8 Pro) is configured with CSI-ReportConfig reporting settings to report CSI (i.e., CQI) to gNB in a particular periodicity and time slots. See Fig. 5.</p> <p style="text-align: center;">Citation 5: UE configured with CSI Reporting & Resource Settings</p> <p>For CQI, PMI, CRI, SSBRI, LI, RI, L1-RSRP, a UE is configured by higher layers with $N \geq 1$ <i>CSI-ReportConfig</i> Reporting Settings, $M \geq 1$ <i>CSI-ResourceConfig</i> Resource Settings, and one or two list(s) of trigger states (given by the higher layer parameters <i>aperiodicTriggerStateList</i> and <i>semiPersistentOnPUSCH-TriggerStateList</i>). Each trigger state in <i>aperiodicTriggerStateList</i> contains a list of associated <i>CSI-ReportConfigs</i> indicating the Resource Set IDs for channel and optionally for interference. Each trigger state in <i>semiPersistentOnPUSCH-TriggerStateList</i> contains one associated <i>CSI-ReportConfig</i>.</p> <p style="text-align: center;">Fig. 5</p> <p>Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf, Page 32, Last Accessed on April 27, 2021, Exhibit B</p> <p>The Reporting Settings enables the UE to configure the periodicity and time slots to adjust (i.e., vary) the transmission rate of the CSI reporting to the gNB. The reporting timing can be set as aperiodic, periodic, <i>Semi-persistent</i>. Based on the configured Reporting Settings, the UE will adjust (i.e., vary) the pattern of the CSIs transmission to the gNB. See Fig. 6 and Fig. 7.</p>
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Citation 6: Various CSI Reporting settings**5.2.1.1 Reporting settings**

Each Reporting Setting *CSI-ReportConfig* is associated with a single downlink BWP (indicated by higher layer parameter *bwp-Id*) given in the associated *CSI-ResourceConfig* for channel measurement and contains the parameter(s) for one CSI reporting band: codebook configuration including codebook subset restriction, time-domain behavior, frequency granularity for CQI and PMI, measurement restriction configurations, and the CSI-related quantities to be reported by the UE such as the layer indicator (LI), L1-RSRP, CRI, and SSBRI (SSB Resource Indicator).

The time domain behavior of the *CSI-ReportConfig* is indicated by the higher layer parameter *reportConfigType* and can be set to 'aperiodic', 'semiPersistentOnPUCCH', 'semiPersistentOnPUSCH', or 'periodic'. For periodic and semiPersistentOnPUCCH/semiPersistentOnPUSCH CSI reporting, the configured periodicity and slot offset applies in the numerology of the UL BWP in which the CSI report is configured to be transmitted on. The higher layer parameter

Fig. 6

Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf,

Page 32, Last Accessed on April 27, 2021, Exhibit B

Citation 7: Resource settings**5.2.1.2 Resource settings**

Each CSI Resource Setting *CSI-ResourceConfig* contains a configuration of $S \geq 1$ CSI Resource Sets (given by higher layer parameter *csi-RS-ResourceSetList*), with each CSI Resource Set consisting of CSI-RS resources (comprised of either NZP CSI-RS or CSI-IM) and SS/PBCH Block resources used for L1-RSRP computation. Each CSI Resource Setting is located in the DL BWP identified by the higher layer parameter *bwp-id*, and all CSI Resource Settings linked to a CSI Report Setting have the same DL BWP.

The time domain behavior of the CSI-RS resources within a CSI Resource Setting are indicated by the higher layer parameter *resourceType* and can be set to aperiodic, periodic, or semi-persistent. For periodic and semi-persistent CSI

Fig. 7

Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf,

Page 32, Last Accessed on April 27, 2021, Exhibit B

One of the configured reporting settings is Semi-persistent CSI reporting. The semi-persistent CSI reporting is a combination of aperiodic and periodic reporting (i.e., Varying reporting rate). Further, the configured semi-persistent CSI reporting settings are triggered by BWP command or trigger (i.e., a function of the presence or absence of reception of data transmission). BWP stands for Bandwidth Part, which a contiguous set of physical resource blocks on a given carrier, and BWP has frequency and time as its attributes. See Fig. 6 to Fig. 10.

Citation 8: Semi-persistent CSI Reporting- Combination of Periodic and Aperiodic

CSI Report Sequence Flow

How these configuration works can be illustrated as below. Periodic and Aperiodic method would be obvious as shown below. Semi-Persistent can be regarded as a kind of mix of Periodic and Aperiodic. The first cycle would be similar to aperiodic, but once the cycle is triggered the CSI RS transmission and CSI Report would happen periodically.

Fig. 8

Source: https://www.sharetechnote.com/html/5G/5G_CSI_Report.html, Page 10, Last Accessed on April 27, 2021, Exhibit E

Citation 9: About BWP

A **Bandwidth Part** (BWP) is a contiguous set of physical resource blocks (PRBs) on a given carrier. These RBs are selected from a contiguous subset of the common resource blocks for a given numerology (μ). It is denoted by **BWP**. Each BWP defined for a numerology can have following three different parameters.

- Subcarrier spacing
- Symbol duration
- Cyclic prefix (CP) length

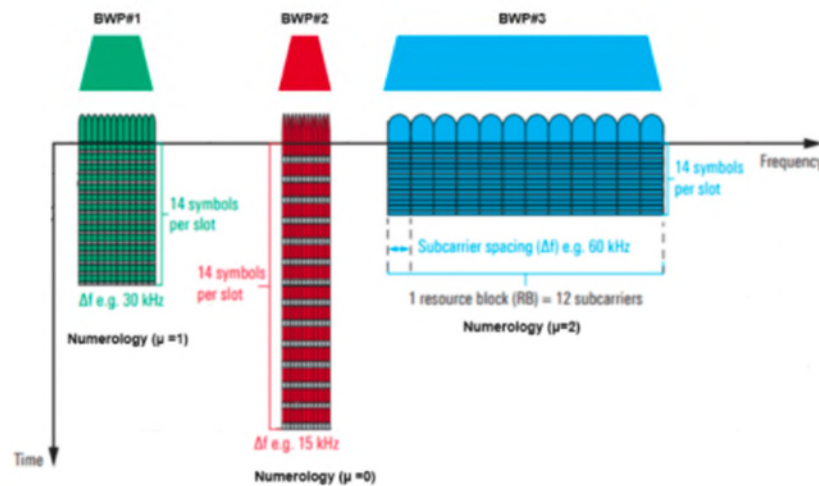


Fig. 9

Source: <http://www.techplayon.com/5g-nr-bandwidth-part-bwp/>, Page 1, Last Accessed on April 27, 2021,

Exhibit F

	<p style="text-align: center;">Citation 10: BWP Activation/Deactivation</p> <p style="text-align: center;">BWP Activation/Deactivation and Switching</p> <p>According to 38.321-5.15 Bandwidth Part (BWP) operation, BWP selection (or BWP switching) can be done by several different ways as listed below.</p> <ul style="list-style-type: none"> • Dedicated RRC Signaling • Over PDCCH channel Downlink control information (DCI)- DCI 0_1 (UL Grant) and DCI 1_0 (DL Scheduling) • By bwp-inactivityTimer – ServingCellConfig.bwp-InactivityTimer • By MAC CE (Control Element) <p style="text-align: center;">Fig. 10</p> <p>Source: http://www.techplayon.com/5g-nr-bandwidth-part-bwp/, Page 1, Last Accessed on April 27, 2021,</p> <p style="text-align: center;">Exhibit F</p>
<p>1b. wherein the mobile station reports channel quality information at a first rate in the absence of a reception of a data transmission from the base station and, upon detection of a reception of a data transmission from the base station, the mobile station</p>	<p>The accused products practice a method wherein the mobile station reports channel quality information at a first rate in the absence of a reception of a data transmission from the base station and, upon detection of a reception of a data transmission from the base station, the mobile station reports channel quality information at a second rate for a prescribed duration.</p> <p>Fig. 11 to Fig. 14 shows that the UE can be configured with semi-persistent CSI reporting based on BWP command or trigger. The UE configured with semi-persistent CSI reporting without any command or trigger from the network (i.e., absence of reception of data transmission from the base station), would be transmitting CSI report in an aperiodic manner (i.e., first rate). Once the BWP command or trigger is received from the network (i.e., upon detection of reception of data transmission from the base station), the UE transmits in a periodic manner (i.e., second rate) for a particular duration (i.e., prescribed duration).</p>

reports channel quality information at a second rate for a prescribed duration.

Citation 11: CSI Reporting settings

5.2.1.1 Reporting settings

Each Reporting Setting *CSI-ReportConfig* is associated with a single downlink BWP (indicated by higher layer parameter *bwp-Id*) given in the associated *CSI-ResourceConfig* for channel measurement and contains the parameter(s) for one CSI reporting band:codebook configuration including codebook subset restriction, time-domain behavior, frequency granularity for CQI and PMI, measurement restriction configurations, and the CSI-related quantities to be reported by the UE such as the layer indicator (LI), L1-RSRP, CRI, and SSBRI (SSB Resource Indicator).

The time domain behavior of the *CSI-ReportConfig* is indicated by the higher layer parameter *reportConfigType* and can be set to 'aperiodic', 'semiPersistentOnPUCCH', 'semiPersistentOnPUSCH', or 'periodic'. For periodic and semiPersistentOnPUCCH/semiPersistentOnPUSCH CSI reporting, the configured periodicity and slot offset applies in the numerology of the UL BWP in which the CSI report is configured to be transmitted on. The higher layer parameter

Fig. 11

Source:https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf,

Page 32, Last Accessed on April 27, 2021, Exhibit B

Citation 12: Resource settings

5.2.1.2 Resource settings

Each CSI Resource Setting *CSI-ResourceConfig* contains a configuration of $S \geq 1$ CSI Resource Sets (given by higher layer parameter *csi-RS-ResourceSetList*), with each CSI Resource Set consisting of CSI-RS resources (comprised of either NZP CSI-RS or CSI-IM) and SS/PBCH Block resources used for L1-RSRP computation. Each CSI Resource Setting is located in the DL BWP identified by the higher layer parameter *bwp-id*, and all CSI Resource Settings linked to a CSI Report Setting have the same DL BWP.

The time domain behavior of the CSI-RS resources within a CSI Resource Setting are indicated by the higher layer parameter *resourceType* and can be set to aperiodic, periodic, or semi-persistent. For periodic and semi-persistent CSI

Fig. 12

Source:https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf,

Page 32, Last Accessed on April 27, 2021, Exhibit B

Citation 13: Semi-persistent CSI Reporting - First Rate and Second Rate**CSI Report Sequence Flow**

How these configuration works can be illustrated as below. Periodic and Aperiodic method would be obvious as shown below. Semi-Persistent can be regarded as a kind of mix of Periodic and Aperiodic. The first cycle would be similar to aperiodic, but once the cycle is triggered the CSI RS transmission and CSI Report would happen periodically.

Fig. 13

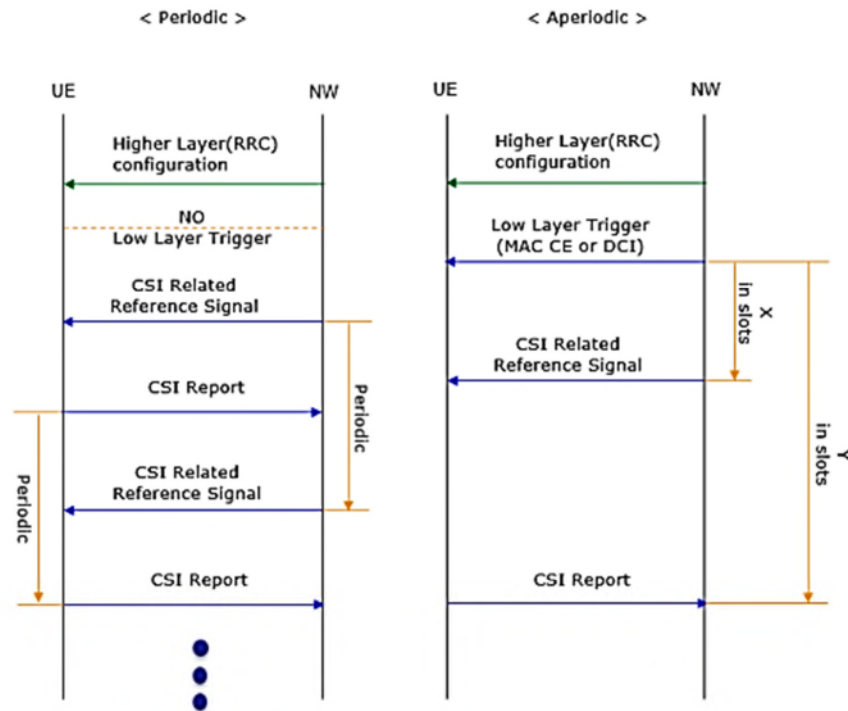
Source: https://www.sharetechnote.com/html/5G/5G_CSI_Report.html, Page 10, Last Accessed on April 27, 2021, Exhibit E

Citation 14: Semi-persistent CSI reporting - command/trigger**Table 5.2.1.4-1: Triggering/Activation of CSI Reporting for the possible CSI-RS Configurations.**

CSI-RS Configuration	Periodic CSI Reporting	Semi-Persistent CSI Reporting	Aperiodic CSI Reporting
Periodic CSI-RS	No dynamic triggering/activation	For reporting on PUCCH, the UE receives an activation command [10, TS 38.321]; for reporting on PUSCH, the UE receives triggering on DCI	Triggered by DCI; additionally, activation command [10, TS 38.321] possible as defined in Subclause 5.2.1.5.1.
Semi-Persistent CSI-RS	Not Supported	For reporting on PUCCH, the UE receives an activation command [10, TS 38.321]; for reporting on PUSCH, the UE receives triggering on DCI	Triggered by DCI; additionally, activation command [10, TS 38.321] possible as defined in Subclause 5.2.1.5.1.
Aperiodic CSI-RS	Not Supported	Not Supported	Triggered by DCI; additionally, activation command [10, TS 38.321] possible as defined in Subclause 5.2.1.5.1.

Fig. 14

	<p>Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf, Page 33, Last Accessed on April 27, 2021, Exhibit B</p>
<p>4. The method according to claim 1, wherein the second rate is faster than the first rate.</p>	<p>The accused products practice a method wherein the second rate is faster than the first rate.</p> <p>The UE configured with semi-persistent CSI reporting without any command or trigger from the network would be transmitting CSI report in an aperiodic manner (i.e., first rate). Once the BWP command or trigger is received from the network, it starts transmitting in a periodic manner (i.e., second rate) for a particular duration.</p> <p>As an example, the time taken by UE to transmit the CSI report in a periodic manner is less as compared to aperiodic CSI reporting. As the time taken in case of periodic CSI reporting is lesser than aperiodic CSI reporting, it implies that the rate of periodic CSI reporting (i.e., second rate) is faster than aperiodic CSI reporting rate (i.e., first rate). See Fig. 15.</p>

Citation 15: CSI Reporting rate in periodic and aperiodic manner

NOTE : X and Y in this illustration is defined as follows in 38.802

- aperiodic CSI-RS timing offset X refers to the time gap between aperiodic CSI-RS triggering and aperiodic CSI-RS transmission with regard to the number of slots
- aperiodic CSI reporting timing offset Y refers to the time gap between aperiodic CSI reporting triggering and aperiodic CSI reporting with regard to the number of slots.

Fig. 15

Source: https://www.sharetechnote.com/html/5G/5G_CSI_Report.html, Page 10, Last Accessed on April 27,

2021, Exhibit E

9Pre. A method for adapting the rate of reporting channel quality information in a wireless communication system including at least one base station and at least one mobile station, the method comprising:

The accused products practice a method for adapting the rate of reporting channel quality information in a wireless communication system including at least one base station and at least one mobile station.

OnePlus 8 series comprises of 5G supported Qualcomm Snapdragon 865 processor along with the Qualcomm Snapdragon X55 5G Modem-RF system for transmission of signals (i.e., Channel Quality Information), as shown in Fig. 16 and Fig. 17.

Citation 16: OnePlus 8 Pro Specifications

Performance

Operating System: OxygenOS based on Android™ 10
 CPU: Qualcomm® Snapdragon™ 865
 5G Chipset: X55
 GPU: Adreno 650
 RAM: 8GB/12GB LPDDR5
 Storage: 128GB/256GB UFS 3.0 2-LANE
 Battery: 4510 mAh (non-removable)
 Warp Charge 30T Fast Charging (5V/6A)
 30W Wireless Charging



Fig. 16

Source: <https://www.oneplus.com/8-pro/specs>, Page 1 and 2, Last Accessed on April 27, 2021, Exhibit A

Citation 17: OnePlus 8 Specifications

Born to perform

Power ahead with the latest Qualcomm® Snapdragon™ 865, which delivers up to 25%* faster performance than previous generations.

X55 Dual Mode 5G

Connect to multiple networks at the same time for wider coverage and faster potential download speeds*.



UFS 3.0

Transfer photos, videos, and files in a snap with UFS 3.0 file management system. An improved file system delivers 125%* faster write speeds than previous generations.

Fig. 17

Source: <https://www.oneplus.com/8?from=head>, Page 4, Last Accessed on April 27, 2021, Exhibit G

Qualcomm Snapdragon 865 processor along with X55 RF modem functions on the 3GPP release 15 specifications of 5G technology. In specific, the 3gpp 38.214 is a 5G based standard that specifies and establishes the characteristics of the physical layer procedures of data channels for 5G-NR.

According to the 3GPP standard, TS 38.214, the User Equipment (i.e., UE), such as OnePlus 8 series (i.e., mobile station) reports (i.e., transmits) the channel state information (CSI) that comprises of channel quality indicator (i.e., channel quality information), in a 5G telecommunication network. Further, the CSI reporting is controlled by gNB (i.e., base station). See Fig. 18 and Fig. 19.

Citation 18: UE reports CSI

5.2 UE procedure for reporting channel state information (CSI)

5.2.1 Channel state information framework

The time and frequency resources that can be used by the UE to report CSI are controlled by the gNB. CSI may consist of Channel Quality Indicator (CQI), precoding matrix indicator (PMI), CSI-RS resource indicator (CRI), SS/PBCH Block Resource indicator (SSBRI), layer indicator (LI), rank indicator (RI) and/or L1-RSRP.

Fig. 18

Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf,

Page 31, Last Accessed on April 27, 2021, Exhibit B

Citation 19: gNB is 5G terminology for base station

5G Terminology: The gNB

5G specifications are ongoing, so there are new acronyms to remember.

So after the BTS (Base Transceiver Station) in 2G, the NodeB in 3G, the eNB in 4G, here comes the gNB in 5G.

Fig. 19

Source: <https://www.5g-networks.net/uncategorized/5g-terminology-the-gnb/>, Page 1, Last Accessed on April

27, 2021, Exhibit C

One Plus 8 Pro supports 5G based standards such as 3gpp 38.214.

The UE (e.g., One Plus 8 Pro) is configured with CSI-ReportConfig reporting settings to report CSI (i.e., CQI) to gNB in a particular periodicity and time slots. See Fig. 20.

Citation 20: UE configured with CSI Reporting & Resource Settings

For CQI, PMI, CRI, SSBRI, LI, RI, LI-RSRP, a UE is configured by higher layers with $N \geq 1$ *CSI-ReportConfig* Reporting Settings, $M \geq 1$ *CSI-ResourceConfig* Resource Settings, and one or two list(s) of trigger states (given by the higher layer parameters *aperiodicTriggerStateList* and *semiPersistentOnPUSCH-TriggerStateList*). Each trigger state in *aperiodicTriggerStateList* contains a list of associated *CSI-ReportConfigs* indicating the Resource Set IDs for channel and optionally for interference. Each trigger state in *semiPersistentOnPUSCH-TriggerStateList* contains one associated *CSI-ReportConfig*.

Fig. 20

Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf,

Page 32, Last Accessed on April 27, 2021, Exhibit B

The Reporting Settings enables the UE to configure the periodicity and time slots to adjust (i.e., vary) the transmission rate of the CSI reporting to the gNB. The reporting timing can be set as aperiodic, periodic, *Semi-persistent*. Based on the configured Reporting Settings, the UE will adjust (i.e., vary) the pattern of the CSIs transmission to the gNB. See Fig. 21 and Fig. 22.

Citation 21: Various CSI Reporting settings**5.2.1.1 Reporting settings**

Each Reporting Setting *CSI-ReportConfig* is associated with a single downlink BWP (indicated by higher layer parameter *bwp-Id*) given in the associated *CSI-ResourceConfig* for channel measurement and contains the parameter(s) for one CSI reporting band: codebook configuration including codebook subset restriction, time-domain behavior, frequency granularity for CQI and PMI, measurement restriction configurations, and the CSI-related quantities to be reported by the UE such as the layer indicator (LI), L1-RSRP, CRI, and SSBRI (SSB Resource Indicator).

The time domain behavior of the *CSI-ReportConfig* is indicated by the higher layer parameter *reportConfigType* and can be set to 'aperiodic', 'semiPersistentOnPUCCH', 'semiPersistentOnPUSCH', or 'periodic'. For periodic and semiPersistentOnPUCCH/semiPersistentOnPUSCH CSI reporting, the configured periodicity and slot offset applies in the numerology of the UL BWP in which the CSI report is configured to be transmitted on. The higher layer parameter

Fig. 21

Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf,

Page 32, Last Accessed on April 27, 2021, Exhibit B

Citation 22: Resource settings**5.2.1.2 Resource settings**

Each CSI Resource Setting *CSI-ResourceConfig* contains a configuration of $S \geq 1$ CSI Resource Sets (given by higher layer parameter *csi-RS-ResourceSetList*), with each CSI Resource Set consisting of CSI-RS resources (comprised of either NZP CSI-RS or CSI-IM) and SS/PBCH Block resources used for L1-RSRP computation. Each CSI Resource Setting is located in the DL BWP identified by the higher layer parameter *bwp-id*, and all CSI Resource Settings linked to a CSI Report Setting have the same DL BWP.

The time domain behavior of the CSI-RS resources within a CSI Resource Setting are indicated by the higher layer parameter *resourceType* and can be set to aperiodic, periodic, or semi-persistent. For periodic and semi-persistent CSI

Fig. 22

Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf,

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<p>9a. reporting channel quality information from the at least one mobile station to the at least one base station at a first rate in the absence of a reception of a data transmission at the at least one mobile station; and</p>	<p>The accused product practices a method comprising reporting channel quality information from the at least one mobile station to the at least one base station at a first rate in the absence of a reception of a data transmission at the at least one mobile station.</p> <p>One of the configured reporting settings is Semi-persistent CSI reporting. The semi-persistent CSI reporting is a combination of aperiodic and periodic reporting (i.e., Varying reporting rate). Further, the configured semi-persistent CSI reporting settings are triggered by BWP command or trigger (i.e., a function of the presence or absence of reception of data transmission). BWP stands for Bandwidth Part, which a contiguous set of physical resource blocks on a given carrier, and BWP has frequency and time as its attributes. See Fig. 23 to Fig. 27.</p> <p style="text-align: center;">Citation 23: Various CSI Reporting settings</p> <p>5.2.1.1 Reporting settings</p> <p>Each Reporting Setting <i>CSI-ReportConfig</i> is associated with a single downlink BWP (indicated by higher layer parameter <i>bwp-Id</i>) given in the associated <i>CSI-ResourceConfig</i> for channel measurement and contains the parameter(s) for one CSI reporting band:codebook configuration including codebook subset restriction, time-domain behavior, frequency granularity for CQI and PMI, measurement restriction configurations, and the CSI-related quantities to be reported by the UE such as the layer indicator (LI), L1-RSRP, CRI, and SSBRI (SSB Resource Indicator).</p> <p>The time domain behavior of the <i>CSI-ReportConfig</i> is indicated by the higher layer parameter <i>reportConfigType</i> and can be set to 'aperiodic', 'semiPersistentOnPUCCH', 'semiPersistentOnPUSCH', or 'periodic'. For periodic and semiPersistentOnPUCCH/semiPersistentOnPUSCH CSI reporting, the configured periodicity and slot offset applies in the numerology of the UL BWP in which the CSI report is configured to be transmitted on. The higher layer parameter</p> <p style="text-align: center;">Fig. 23</p> <p>Source:https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf,</p> <p style="text-align: center;">Page 32, Last Accessed on April 27, 2021, Exhibit B</p>
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Citation 24: Resource settings**5.2.1.2 Resource settings**

Each CSI Resource Setting *CSI-ResourceConfig* contains a configuration of $S \geq 1$ CSI Resource Sets (given by higher layer parameter *csi-RS-ResourceSetList*), with each CSI Resource Set consisting of CSI-RS resources (comprised of either NZP CSI-RS or CSI-IM) and SS/PBCH Block resources used for L1-RSRP computation. Each CSI Resource Setting is located in the DL BWP identified by the higher layer parameter *bwp-id*, and all CSI Resource Settings linked to a CSI Report Setting have the same DL BWP.

The time domain behavior of the CSI-RS resources within a CSI Resource Setting are indicated by the higher layer parameter *resourceType* and can be set to aperiodic, periodic, or semi-persistent. For periodic and semi-persistent CSI

Fig. 24

Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf,

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Citation 25: Semi-persistent CSI Reporting- Combination of Periodic and Aperiodic**CSI Report Sequence Flow**

How these configuration works can be illustrated as below. Periodic and Aperiodic method would be obvious as shown below. Semi-Persistent can be regarded as a kind of mix of Periodic and Aperiodic. The first cycle would be similar to aperiodic, but once the cycle is triggered the CSI RS transmission and CSI Report would happen periodically.

Fig. 25

Source: https://www.sharetechnote.com/html/5G/5G_CSI_Report.html, Page 10, Last Accessed on April 27,

2021, Exhibit E

Citation 26: About BWP

A **Bandwidth Part** (BWP) is a contiguous set of physical resource blocks (PRBs) on a given carrier. These RBs are selected from a contiguous subset of the common resource blocks for a given numerology (μ). It is denoted by **BWP**. Each BWP defined for a numerology can have following three different parameters.

- Subcarrier spacing
- Symbol duration
- Cyclic prefix (CP) length

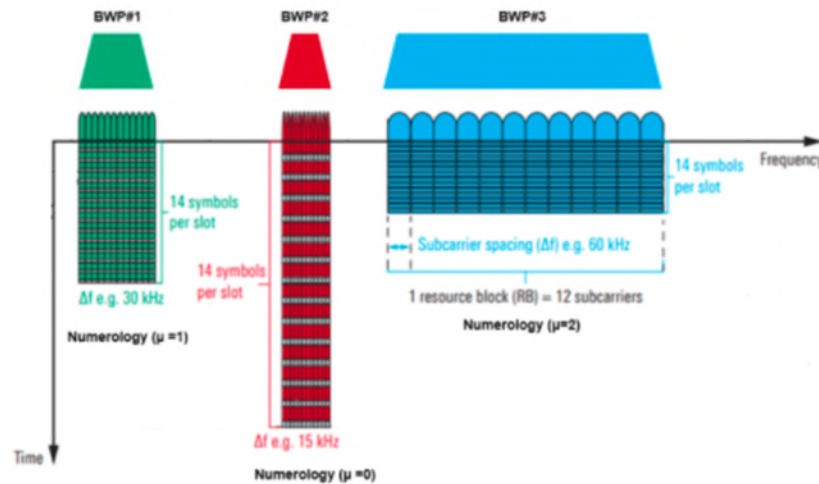


Fig. 26

Source: <http://www.techplayon.com/5g-nr-bandwidth-part-bwp/>, Page 1, Last Accessed on April 27, 2021,

Exhibit F

Citation 27: BWP Activation/Deactivation**BWP Activation/Deactivation and Switching**

According to 38.321-5.15 Bandwidth Part (BWP) operation, BWP selection (or BWP switching) can be done by several different ways as listed below.

- Dedicated RRC Signaling
- Over PDCCH channel Downlink control information (DCI)- DCI 0_1 (UL Grant) and DCI 1_0 (DL Scheduling)
- By bwp-inactivityTimer – ServingCellConfig.bwp-InactivityTimer
- By MAC CE (Control Element)

Fig. 27

Source: <http://www.techplayon.com/5g-nr-bandwidth-part-bwp/>, Page 1, Last Accessed on April 27, 2021,

Exhibit F

As shown in Fig. 23, Fig. 25, and Fig. 28, the UE can be configured with semi-persistent CSI reporting based on BWP command or trigger. The UE configured with semi-persistent CSI reporting without any command or trigger from the network (i.e., absence of reception of data transmission from the base station), would be transmitting CSI report in an aperiodic manner (i.e., first rate). Once the BWP command or trigger is received from the network (i.e., upon detection of reception of data transmission from the base station), the UE transmits in a periodic manner (i.e., second rate) for a particular duration.

Citation 28: Semi-persistent CSI reporting - command/trigger**Table 5.2.1.4-1: Triggering/Activation of CSI Reporting for the possible CSI-RS Configurations.**

CSI-RS Configuration	Periodic CSI Reporting	Semi-Persistent CSI Reporting	Aperiodic CSI Reporting
Periodic CSI-RS	No dynamic triggering/activation	For reporting on PUCCH, the UE receives an activation command [10, TS 38.321]; for reporting on PUSCH, the UE receives triggering on DCI	Triggered by DCI; additionally, activation command [10, TS 38.321] possible as defined in Subclause 5.2.1.5.1.
Semi-Persistent CSI-RS	Not Supported	For reporting on PUCCH, the UE receives an activation command [10, TS 38.321]; for reporting on PUSCH, the UE receives triggering on DCI	Triggered by DCI; additionally, activation command [10, TS 38.321] possible as defined in Subclause 5.2.1.5.1.
Aperiodic CSI-RS	Not Supported	Not Supported	Triggered by DCI; additionally, activation command [10, TS 38.321] possible as defined in Subclause 5.2.1.5.1.

Fig. 28

Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf,

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9b. in the presence of a reception of a data transmission at the at least one mobile station, adapting the rate for reporting channel quality information from the at

The accused products practice a method comprising in the presence of a reception of a data transmission at the at least one mobile station, adapting the rate for reporting channel quality information from the at least one mobile station to the at least one base station from the first rate to a second rate for a prescribed duration.

Fig. 29 to Fig. 31 **Error! Reference source not found.** show that the UE can be configured with semi-persistent CSI reporting based on BWP command or trigger. The UE configured with semi-persistent CSI reporting without any command or trigger from the network (i.e., absence of reception of data transmission from the base station), would be transmitting CSI report in an aperiodic manner (i.e., first rate). Once the BWP command or trigger is

least one mobile station to the at least one base station from the first rate to a second rate for a prescribed duration.

received from the network (i.e., upon detection of reception of data transmission from the base station), the UE transmits in a periodic manner (i.e., second rate) for a particular duration (i.e., prescribed duration).

Citation 29: Various CSI Reporting settings

5.2.1.1 Reporting settings

Each Reporting Setting *CSI-ReportConfig* is associated with a single downlink BWP (indicated by higher layer parameter *bwp-Id*) given in the associated *CSI-ResourceConfig* for channel measurement and contains the parameter(s) for one CSI reporting band: codebook configuration including codebook subset restriction, time-domain behavior, frequency granularity for CQI and PMI, measurement restriction configurations, and the CSI-related quantities to be reported by the UE such as the layer indicator (LI), L1-RSRP, CRI, and SSBRI (SSB Resource Indicator).

The time domain behavior of the *CSI-ReportConfig* is indicated by the higher layer parameter *reportConfigType* and can be set to 'aperiodic', 'semiPersistentOnPUCCH', 'semiPersistentOnPUSCH', or 'periodic'. For periodic and semiPersistentOnPUCCH/semiPersistentOnPUSCH CSI reporting, the configured periodicity and slot offset applies in the numerology of the UL BWP in which the CSI report is configured to be transmitted on. The higher layer parameter

Fig. 29

Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf,

Page 32, Last Accessed on April 27, 2021, Exhibit B

Citation 30: Semi-persistent CSI Reporting - First Rate and Second Rate

CSI Report Sequence Flow

How these configuration works can be illustrated as below. Periodic and Aperiodic method would be obvious as shown below. Semi-Persistent can be regarded as a kind of mix of Periodic and Aperiodic. The first cycle would be similar to aperiodic, but once the cycle is triggered the CSI RS transmission and CSI Report would happen periodically.

Fig. 30

Source: https://www.sharetechnote.com/html/5G/5G_CSI_Report.html, Page 10, Last Accessed on April 27, 2021, Exhibit E

Citation 31: Semi-persistent CSI reporting - command/trigger**Table 5.2.1.4-1: Triggering/Activation of CSI Reporting for the possible CSI-RS Configurations.**

CSI-RS Configuration	Periodic CSI Reporting	Semi-Persistent CSI Reporting	Aperiodic CSI Reporting
Periodic CSI-RS	No dynamic triggering/activation	For reporting on PUCCH, the UE receives an activation command [10, TS 38.321]; for reporting on PUSCH, the UE receives triggering on DCI	Triggered by DCI; additionally, activation command [10, TS 38.321] possible as defined in Subclause 5.2.1.5.1.
Semi-Persistent CSI-RS	Not Supported	For reporting on PUCCH, the UE receives an activation command [10, TS 38.321]; for reporting on PUSCH, the UE receives triggering on DCI	Triggered by DCI; additionally, activation command [10, TS 38.321] possible as defined in Subclause 5.2.1.5.1.
Aperiodic CSI-RS	Not Supported	Not Supported	Triggered by DCI; additionally, activation command [10, TS 38.321] possible as defined in Subclause 5.2.1.5.1.

Fig. 31

Source: https://www.etsi.org/deliver/etsi_ts/138200_138299/138214/15.02.00_60/ts_138214v150200p.pdf,

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10. The method according to claim 9, wherein the second rate is faster than the first rate.

The accused products practice a method wherein the second rate is faster than the first rate.

Refer to supporting evidence of claim element 4.